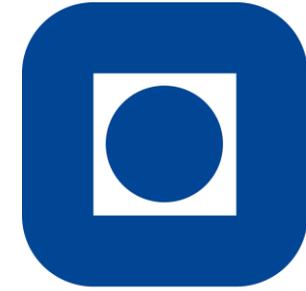


Ingvild Haugan

NordicAST Workshop Malmö May 9<sup>th</sup>-10<sup>th</sup>  
2023



# To rast or not to rast



NTNU



# 1st project

Evaluate EUCAST rapid AST

and

dRAST™ by Quantamatrix

and

Compare with laboratory routine method

(disk diffusion method directly from BC)

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Master thesis

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**NTNU**

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Co-supervisor: **Kjersti Haugum**

## E-RAST

- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Pseudomonas aeruginosa*
- *Acinetobacter baumannii*
  
- *Staphylococcus aureus*
- *Enterococcus faecalis* & *faecium*
- *Streptococcus pneumoniae*

## dRAST™

- Enterobacterales
- *Pseudomonas* spp.
- *Acinetobacter* spp.
- *Stenotrophomonas maltophilia*
- *Burkholderia cepacia*
- *Burkholderia pseudomallei*
  
- *Staphylococcus* spp.
- *Enterococcus* spp.

# Ab panels – gram negative

## E-RAST

(Ampicillin)	Gentamicin
Cefotaxime	Piperacillin/tazobactam
Ceftazidime	Ciprofloxacin
Meropenem	Trimethoprim/sulfa

## dRAST™

Ampicillin	Gentamicin
Cefotaxime	Piperacillin/tazobactam
Ceftazidime	Cefepime
Meropenem	Ciprofloxacin
Amikacin	Imipenem
Ceftazidime/avibactam	Trimethoprim/sulfa

# Ab panels – gram positive

## E-RAST

Cefoxitin (screen)	Clindamycin
Gentamicin	Ampicillin
Linezolid	

## dRAST™

Cefoxitin (screen)	Ampicillin
Gentamicin	Penicillin
Vancomycin	Linezolid
Clindamycin	Rifampicin
Fucidic acid	Tetracyclin
	Erythromycin

# Work flow

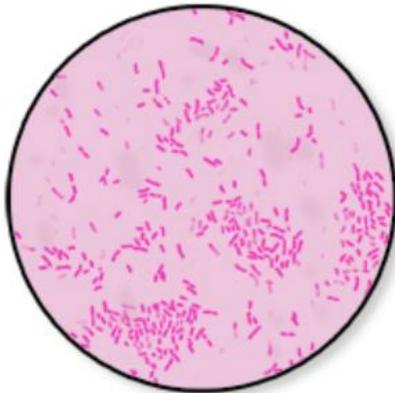
## **EUCAST rAST**

- The set up is familiar
  - same as what we normally do
- Must be read at precise times
  - 4-6-8 hours
- Results must be manually entered

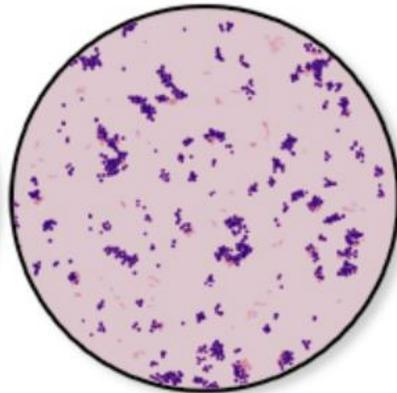
## **dRAST™**

- No sample prep
- Automatic reading
- Results can be transferred directly to LIS system

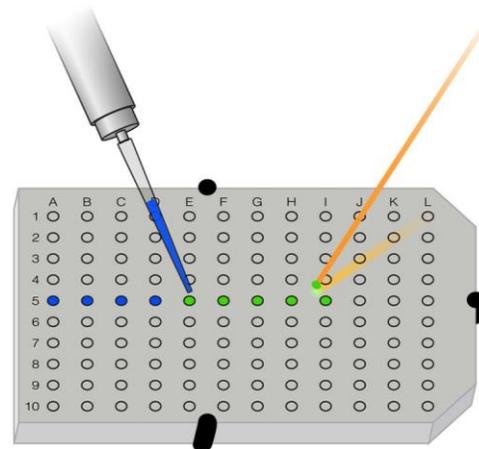
# dRAST™



Gram-negative



Gram-positive



③ MALDI-TOF/MS sample plate



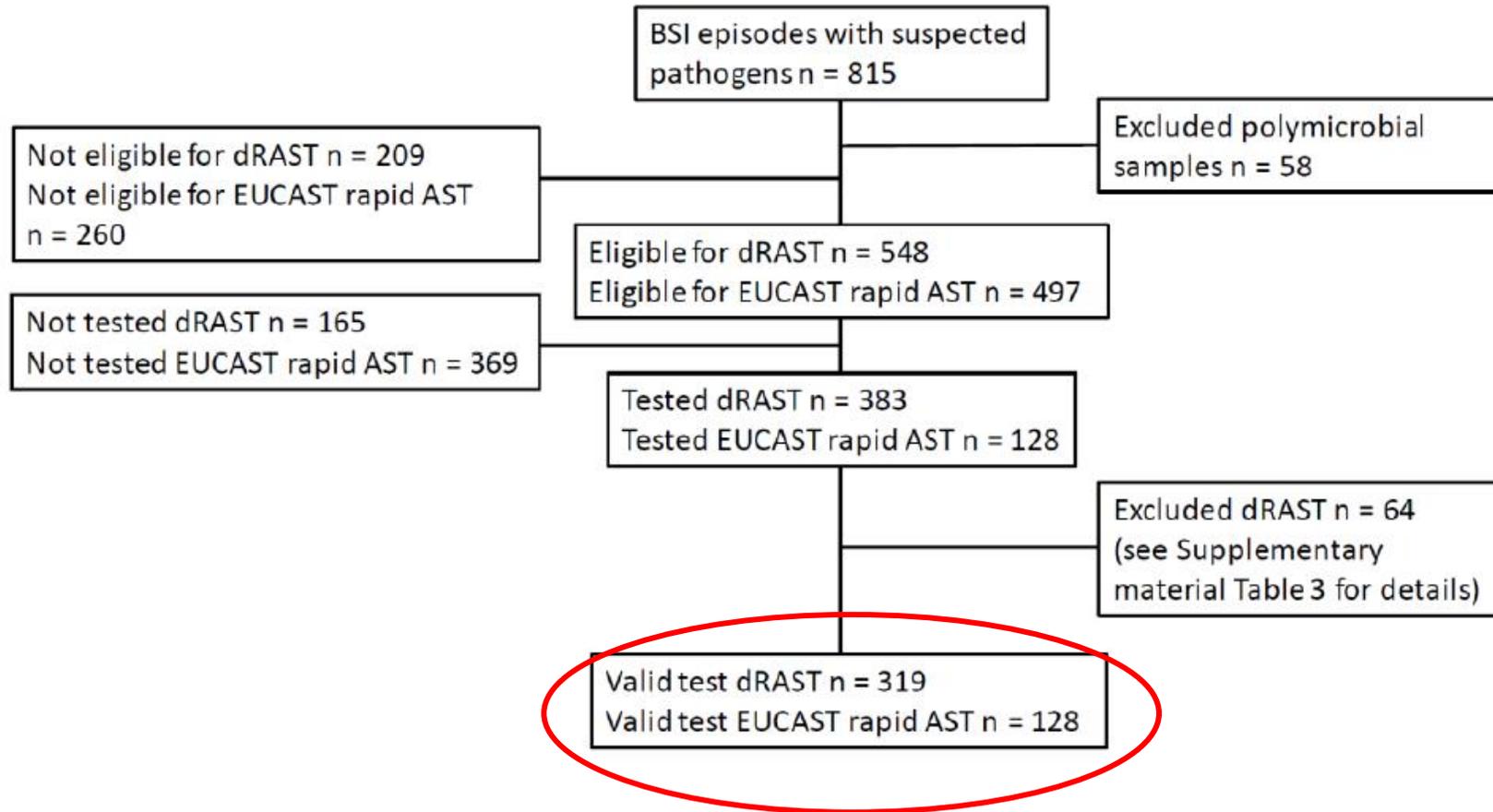
## Proportion eligible based on species

- 61% for E-RAST
- 67% for dRAST™

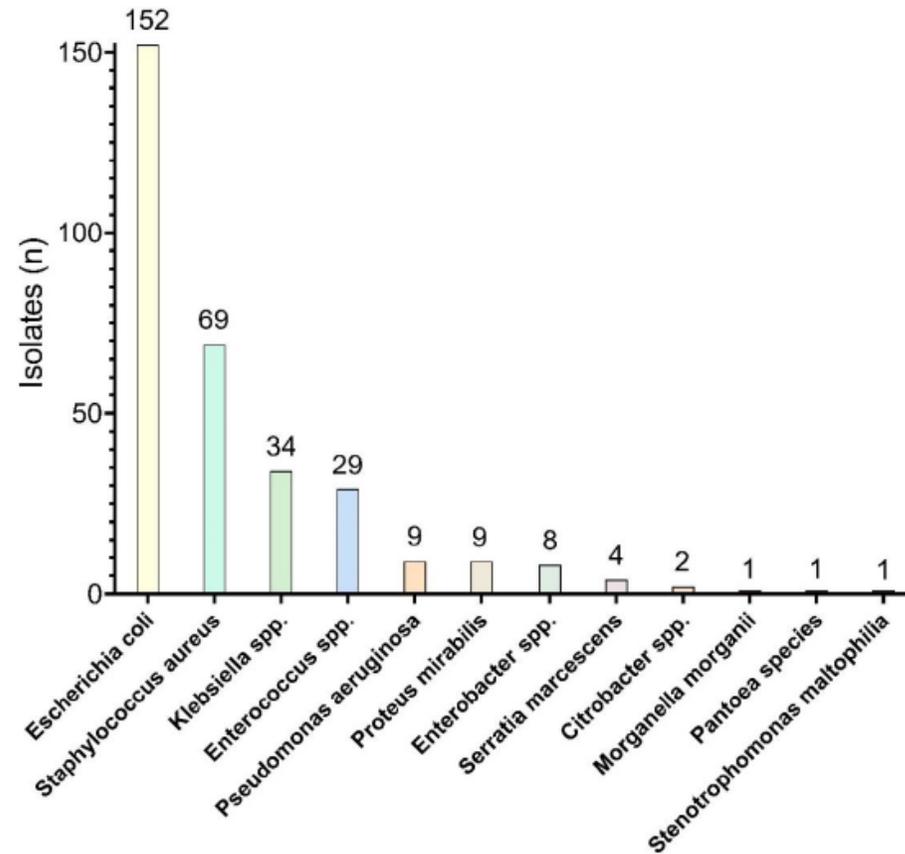
## Proportion eligible based on species and time

- 48% for E-RAST
- 67% for dRAST™

# August 2020 – august 2021

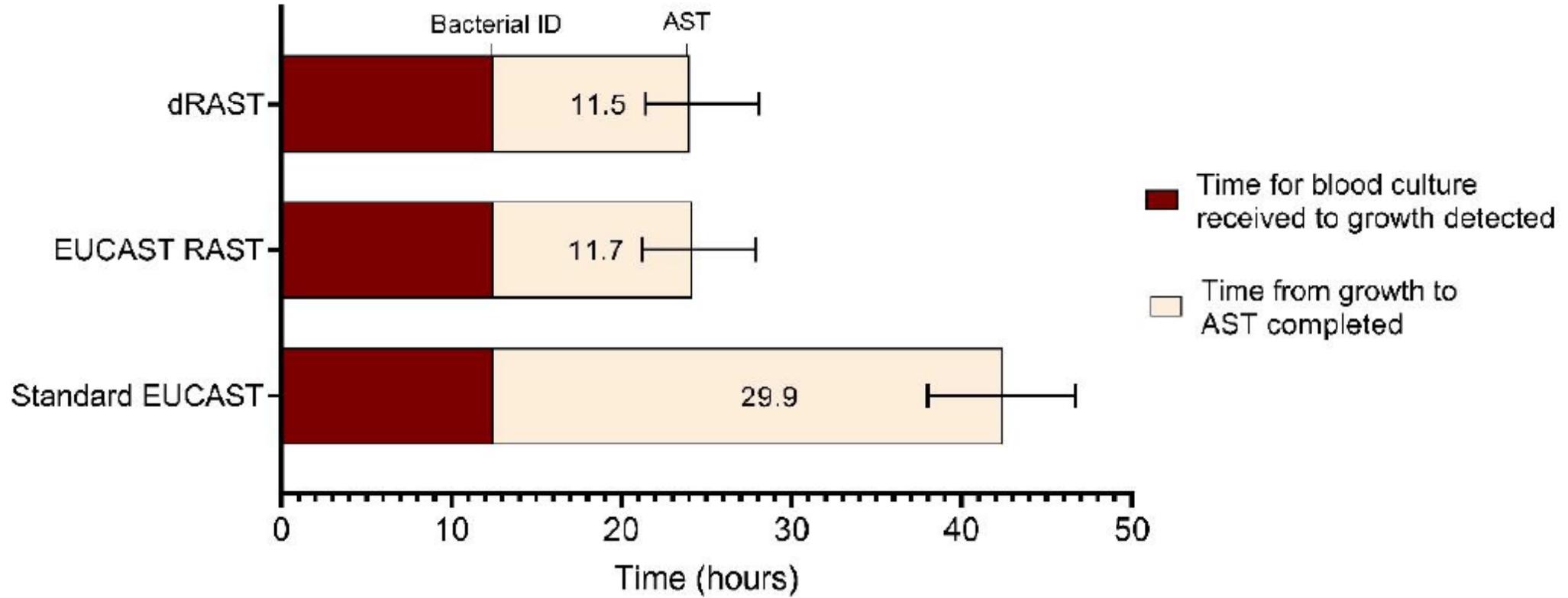


# Blood culture isolates tested with rAST (n=319)



# Time comparison

	EUCAST DD direct from BC		EUCAST rAST		dRAST™	
	N	Hours, median (IQR)	N	Hours, median (IQR)	N	Hours, median (IQR)
From detected growth to complete AST	310	29.9 (25.5-34.2)	121	11.7 (8.7-15.4)	272	11.5 (8.9-15.6)
From start of AST to complete AST			126	6.0 (4.0-6.0)	289	6.6 (6.6-6.7)
Gram pos			37	6.0 (4.0-6.0)	84	6.6 (6.6-6.7)
Gram neg			89	6.0 (4.0-6.0)	205	6.6 (6.6-6.6)
Total time	314	44.9 (38.9-49.3)	121	24.5 (20.9-29.1)	270	27.0 (22.6-30.8)



# Categorical agreement

## **Very major error:**

Reporting S when it should be R

## **Major error:**

Reporting R when it should be S

## **Minor error:**

Reporting I when it should be S or R

# Result comparison

## E-RAST

- Gram negative
  - VME: 1 TMS
  - ME: 1 TMS
  - mE: 1 cefta, 2 cipro, 1 meropenem, 2 pip/tazo

## dRAST™

- Gram negative
  - ME: 3 ampi, 2 cefepime, **2 cefotax, 2 cefta**, 2 cipro, **1 genta**, 1 pip/tazo, 6 amoxi/clav, 2 TMS, **2 ESBL**
  - mE: 2 cefepime, 2 cefotax, 6 cefta, 4 cipro, 3 imipenem, 2 meropenem, 6 pip/taz, 3 TMS
- Gram positive
  - VME: **1 ampi**, 1 genta, 4 penicillin, **2 MRSA**, 2 erythro, 2 ind clinda
  - ME: 5 penicillin, 4 MRSA, 2 genta, 3 linezolid, 2 fucidic acid, 3 tetra, 1 clinda, 1 erythro
  - mE: 1 ampi, 2 clinda, 1 erythro, 2 rifampicin

# Whats the point of AST?

- 82.1% susceptible to the Ab given before any blood culture result
- 94.6% susceptible to the Ab given after microbe ID
- 97.7% susceptible to the Ab given after AST
  
- Possible benefits
  - Better outcome in those who change treatment due to AST
  - Shorter hospital/ICU stay
  - Deescalation of antibiotic treatment

# Thank you

